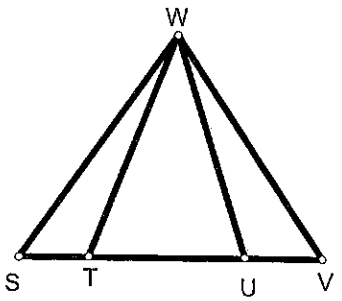
Mrs. Hayden

Name_____ Date_____

**Overlapping Triangles proofs**

1. Given: $\overline{WT} \cong \overline{WU}$ and $\overline{SU} \cong \overline{VT}$

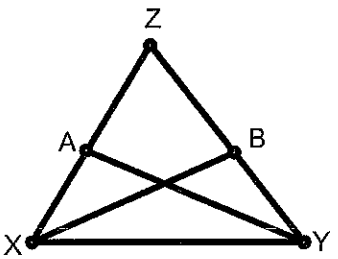
   Prove: $\Delta SUW \cong \Delta VTW$




| Statements | Reasons |
|---|---|
| | |

2. Given: $\overline{XZ} \cong \overline{YZ}$ and $\angle ZXB \cong \angle ZYA$

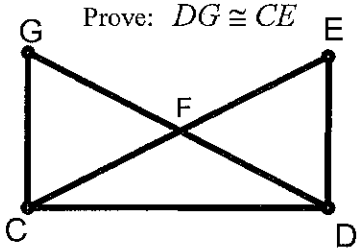
   Prove: $\overline{XB} \cong \overline{YA}$




| Statements | Reasons |
|---|---|
| | |

3. Given: $\overline{GC} \perp \overline{CD}$, $\overline{ED} \perp \overline{CD}$ and $\overline{CG} \cong \overline{DE}$

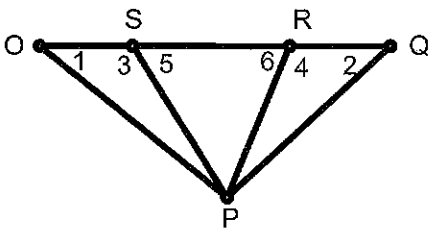
   Prove: $\overline{DG} \cong \overline{CE}$




| Statements | Reasons |
|---|---|
| | |

4. Given: $\angle 1 \cong \angle 2, \angle 3 \cong \angle 4$

   Prove: $\Delta$ OPR $\cong \Delta$ QPS



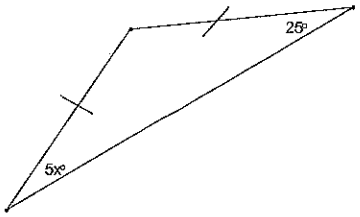

| Statements | Reasons |
|---|---|
| | |

Mrs. Hayden

# Isosceles Triangle Theorem and the Converse

Solve for x. Show all work.

5._____

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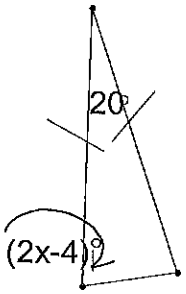


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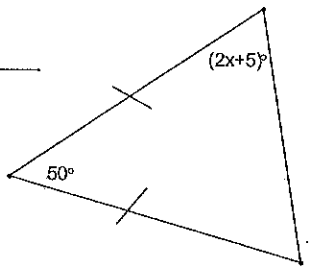


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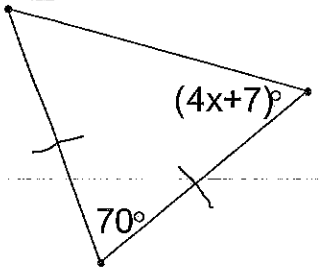


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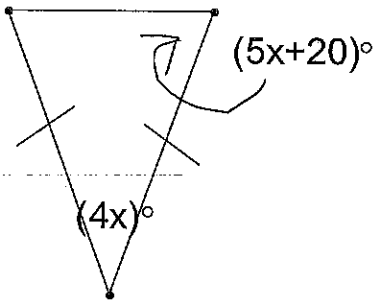


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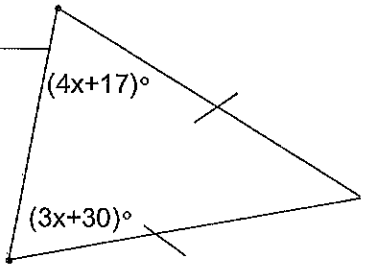
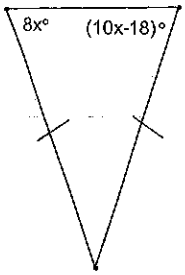
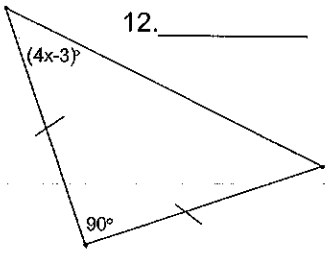


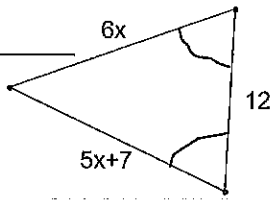

11._____




12._____




13._____

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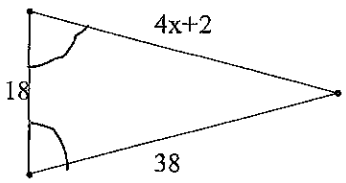
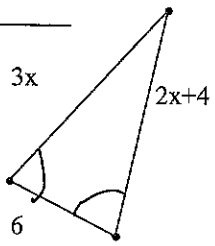
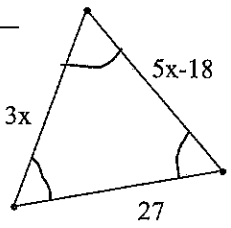



15._____




16._____



NAME _____ DATE _____ PERIOD ____

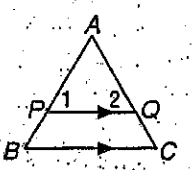
# 4-6 Study Guide and Intervention *(continued)*

## Isosceles Triangles

**Properties of Equilateral Triangles** An **equilateral triangle** has three congruent sides. The Isosceles Triangle Theorem can be used to prove two properties of equilateral triangles.

1. A triangle is equilateral if and only if it is equiangular.
2. Each angle of an equilateral triangle measures 60°.

**Example** **Prove that if a line is parallel to one side of an equilateral triangle, then it forms another equilateral triangle.**

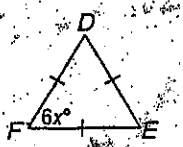


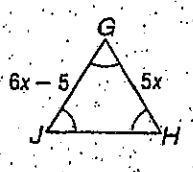

**Proof:**

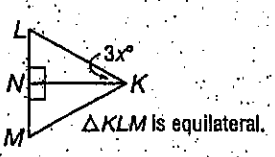
| Statements | Reasons |
|---|---|
| 1. $\triangle ABC$ is equilateral; $\overline{PQ} \parallel \overline{BC}$. | 1. Given |
| 2. $m\angle A = m\angle B = m\angle C = 60$ | 2. Each $\angle$ of an equilateral $\triangle$ measures 60°. |
| 3. $\angle 1 \cong \angle B$, $\angle 2 \cong \angle C$ | 3. If $\parallel$ lines, then corres. $\angle$s are $\cong$. |
| 4. $m\angle 1 = 60$, $m\angle 2 = 60$ | 4. Substitution |
| 5. $\triangle APQ$ is equilateral. | 5. If a $\triangle$ is equiangular, then it is equilateral. |

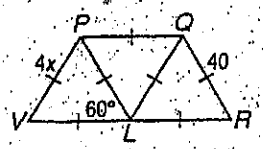
**Exercises**

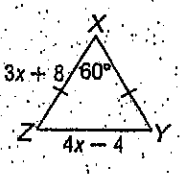
**Find $x$.**

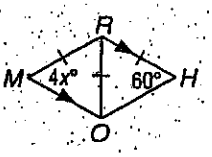
1. 


2. 


3. 


4. 

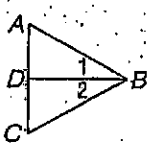

5. 


6. 


Write a two-column proof.

**Given:** $\triangle ABC$ is equilateral; $\angle 1 \cong \angle 2$.

**Prove:** $\angle ADB \cong \angle CDB$




**Proof:**

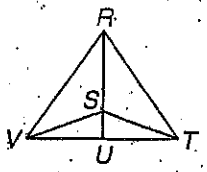
| Statements | Reasons |
|---|---|
| | |

NAME _____ DATE _____ PERIOD _____

# 4-6 Practice

## Isosceles Triangles

**Refer to the figure.**



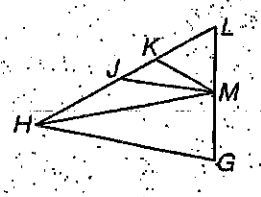

1. If $\overline{RV} \cong \overline{RT}$, name two congruent angles.

2. If $\overline{RS} \cong \overline{SV}$, name two congruent angles.

3. If $\angle SRT \cong \angle STR$, name two congruent segments.

4. If $\angle STV \cong \angle SVT$, name two congruent segments.

**Triangles $GHM$ and $HJM$ are isosceles, with $\overline{GH} \cong \overline{MH}$ and $\overline{HJ} \cong \overline{MJ}$. Triangle $KLM$ is equilateral, and $m\angle HMK = 50$. Find each measure.**




5. $m\angle KML$ 6. $m\angle HMG$ 7. $m\angle GHM$

8. If $m\angle HJM = 145$, find $m\angle MHJ$.

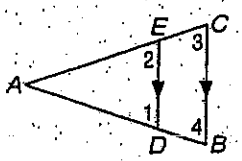
9. If $m\angle G = 67$, find $m\angle GHM$.

10. Write a two-column proof.

**Given:** $\overline{DE} \parallel \overline{BC}$

$\angle 1 \cong \angle 2$

**Prove:** $\overline{AB} \cong \overline{AC}$




11. **SPORTS** A pennant for the sports teams at Lincoln High School is in the shape of an isosceles triangle. If the measure of the vertex angle is 18, find the measure of each base angle.